

FIG. 1

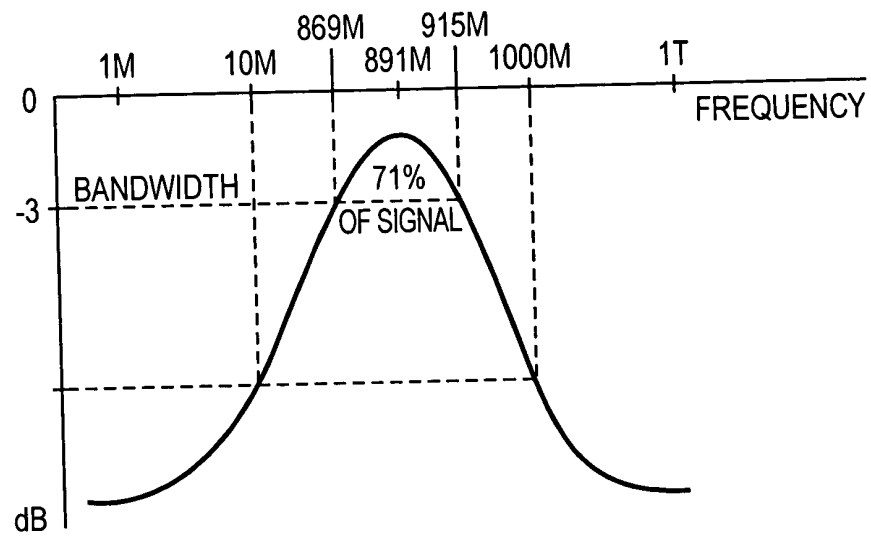


FIG. 2

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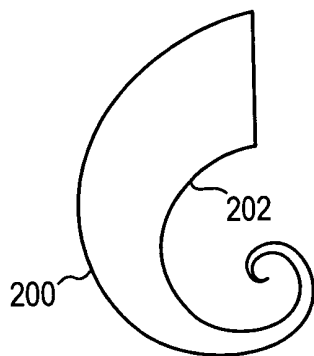


FIG. 3

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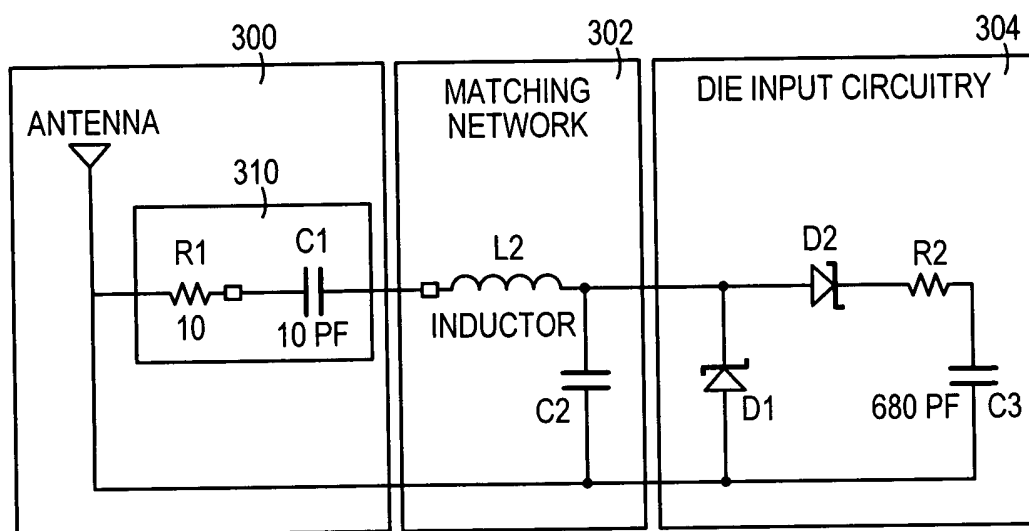


FIG. 4

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OPERATING FREQUENCY: $F=915 \times 10^6 \text{ Hz}$ ANTENNA GAIN: $G=5 \text{ dB}$

ANTENNA INPUT

IMPEDANCE: $Z_{in}=18$ DIE INPUT IMPEDANCE: $Z_{out}=3000$

$$A_v = 10^{\frac{G}{10}}$$

QUALITY FACTOR:

$$Q = \sqrt{\left(\frac{Z_{out}}{Z_{in}}\right) - 1}$$

$$A_v = 3.162$$

TRANSMITTER POWER: $P_t = 1 \text{ W}$

$$Q = 12.871$$

TRANSFORMATION RATIO: $T_r = \sqrt{\frac{Z_{out}}{Z_{in}}}$ HALF WAVELENGTH $W_1 = 0.439 \text{ feet}$ DISTANCE LAG FROM
READER:

$$d = 5 \text{ feet}$$

$$T_r = 12.91$$

POWER AT RECEIVE
ANTENNAMATCHING NETWORK
CALCULATIONS

SERIES INDUCTOR:

$$\begin{aligned} X_1 &= Q \cdot Z_{in} \\ X_1 &= 231.681 \\ L &= \frac{X_1}{(2 \pi \cdot F)} \end{aligned}$$

$$\text{POWER} = \left[\frac{(2 \cdot W_1)}{(4 \pi \cdot d)} \right]^2 \cdot P_t \cdot A_v$$

$$\text{POWER} = 6.175 \times 10^{-4} \text{ watts}$$

VOLTAGE AT RECEIVE
ANTENNA

$$L = 4.03 \times 10^{-8} \text{ H}$$

$$V_r = \sqrt{(Z_{in} \cdot \text{Power})}$$

PARALLEL CAPACITOR:

$$X_c = \frac{Z_{out}}{Q}$$

$$V_r = 0.105 \text{ volts}$$

VOLTAGE USING
TRANSFORMATION RATIO

$$X_c = 233.079$$

$$V_t = V_r \left(\sqrt{\frac{Z_{out}}{Z_{in}}} \right)$$

$$C = \frac{1}{(2 \pi \cdot F \cdot X_c)}$$

$$V_t = 1.361 \text{ volts}$$

$$C = 7.463 \times 10^{-13} \text{ F}$$

VOLTAGE AFTER
VOLTAGE DOUBLER

$$V_{in} = 2.8 \cdot V_t - 0.6$$

$$V_{in} = 3.211 \text{ volts}$$

FIG. 5

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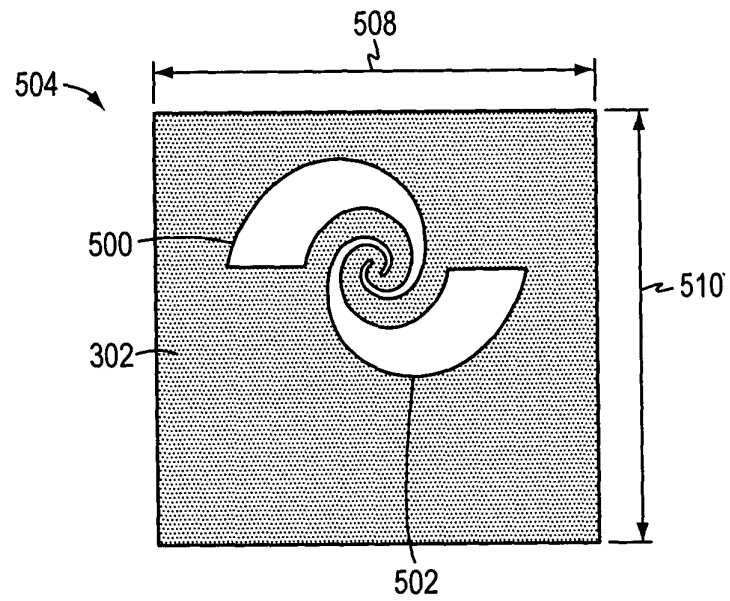


FIG. 6A

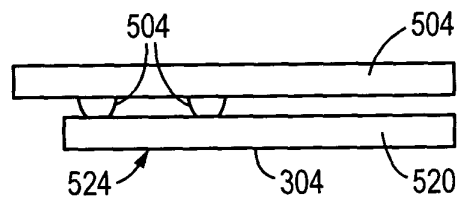


FIG. 6B

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